SOP 7 - Electrically Powered Laboratory Equipment

A. General Principles

1. Electrically operated equipment shall be grounded or double insulated.

2. New electrical construction in wet areas (e.g., restrooms) or outdoor areas shall be built with ground fault circuit interrupters.

3. Electrical equipment showing damage or exposed conductors shall be removed from service and repaired or replaced prior to use.

4. Non-sparking electrical equipment shall be specified in laboratories where volatile flammable chemicals are in use.

5. Electrical equipment shall be placed to minimize the potential of water or chemicals splashing on it.

6. De-energize electrical equipment prior to performing maintenance on it.

B. Drying Ovens

1. Do not use drying ovens to dry chemicals of moderate or greater volatility or chemicals that may pose an acute or chronic health hazard unless the oven is properly vented to outside the laboratory.

2. Rinse in distilled water, prior to placing in a drying oven, glassware that has been washed in organic solvent.

3. Verify that the heating elements and temperature controls of drying ovens are physically separated from the interior atmosphere of the oven.

4. Bimetallic strip thermometers are preferable to mercury thermometers for measuring the temperature of drying ovens.

C. Extension Cords

1. Extension cords shall only be used for temporary electric service.

2. Verify that extension cords are grounded and in proper condition prior to usage.

3. Do not run extension cords through doors, windows, or other areas where they can become damaged.

D. Heating Devices

1. Equip electrical heating devices with temperature sensing devices to deactivate the heater if its temperature exceeds a preset limit.

2. Laboratory Hot Plates

   a. Insure that laboratory hot plates have electrically insulated heating elements and non-sparking switches.

   b. Maintain the thermostat in proper operating condition to insure that temperature control is preserved.

3. Heating Mantles

a. Operate heating mantles at proper line voltage to prevent overheating and damage to electrical insulation.

b. Insure that metal clad heating mantles are electrically grounded.

4. Oil Baths

a. Equip oil baths with temperature sensing devices to prevent the oil from reaching flash point.

b. Use heated oil in metal pans or heavy walled porcelain dishes; glassware can break.

c. Mount oil baths on stable horizontal surfaces.

d. Position the oil bath to reduce the possibility of water or volatile substances falling into the hot bath.

5. Air Baths

a. Construct air baths so that the heating element is completely enclosed.

b. Wrap glass vessels with heat resistant tape so that, if the vessel is accidentally broken, the glass will be retained and the bare heating element covered.

c. Heat Guns should not be used where flammable vapors may be present, because they usually have exposed heating elements and sparking switches.

E. Refrigerators

1. Post prominent signs on refrigerators containing toxic, radioactive, or flammable materials.

a. The interior atmosphere of such refrigerators may contain hazardous concentrations of vapors.

b. Do not place your face inside a refrigerator when looking for a chemical.

c. Do not place uncapped containers of chemicals inside laboratory refrigerators.

d. Minimize the length of time that highly flammable or highly toxic chemicals are stored in a refrigerator.

2. Locate laboratory refrigerators against fire-resistant walls.

F. Stirring and Mixing Devices

1. Verify that the motors and switches of stirring devices are of non-sparking construction.

2. Consider and plan for the consequences of stirring device failure or power source failure if a stirring operation is to be left unattended for an extended period of time.

G. Vacuum Pumps

1. Distill highly volatile substance with water or steam aspirators.

2. Vent the output of a vacuum pump to an air exhaust system to preclude venting hazardous substances into the laboratory atmosphere.